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| 09/740,969      | 12/21/2000  | Shigeo Kure          | HTOH-050-035        | 6271             |

20374 7590 05/27/2003

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EXAMINER

GRIFFIN, WALTER DEAN

| ART UNIT | PAPER NUMBER |
|----------|--------------|
|----------|--------------|

1764

DATE MAILED: 05/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/740,969

Applicant(s)

KURE ET AL.

Examiner

Walter D. Griffin

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on 12 May 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☐ Claim(s) 1-3 and 5-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☐ Claim(s) 1-3 and 5-22 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. 09/139,773.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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**DETAILED ACTION*****Continued Examination Under 37 CFR 1.114***

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on May 12, 2003 has been entered.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any

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evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3, 4-14, 18, 21, and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angevine (US 4,306,964).

The Angevine reference discloses a hydrotreating process in which a hydrocarbon feed and hydrogen sequentially contact three or more catalysts in a reactor. This sequential contacting would necessarily be as a result of one of the contacting methods of claim 18. The catalysts in the reactor comprise an alumina support and hydrogenation metals from Groups VI and VIII. Cobalt, molybdenum, tungsten, and nickel are disclosed as being effective metals in the catalysts. A preferred catalyst contains cobalt in amounts ranging from about 2 to about 10 wt% and molybdenum in amounts ranging from about 5 to about 20 wt%. Hydrotreating conditions include temperatures ranging from 600° F to 850° F (315° C to 454° C), pressures ranging from about 500 to 3000 psig (3.4 to 20.7 MPa), and hydrogen circulation rates ranging from about 1000 to 15000 SCF/bbl (178 to 2672 Nm<sup>3</sup>/m<sup>3</sup>). The catalysts in the layers have sequentially increasing surface areas. This would necessarily satisfy the relationship represented by the formula:  $S_n \leq S_{n+1}$ . The pore volumes shown in Table I would also satisfy the relationship represented by the formula:  $1.15V_n \geq V_{n+1}$ . (See col. 4, line 16 through col. 7, line 18).

The Angevine reference does not specifically disclose at least 4 layers of catalyst or 6 layers of catalyst that satisfy the claimed surface area and pore volume relationships and does not disclose the claimed amount of catalyst in each layer.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process and reactor of Angevine by utilizing at least 4

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catalyst layers including 6 catalyst layers that satisfy the claimed relationships because the disclosure of three or more layers coupled with the disclosure of a three catalyst system satisfying the claimed relationships would result in the expectation that the use of a four or more layer catalyst system would be effective for hydroprocessing hydrocarbons.

It also would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the reactor of Angevine by utilizing the claimed amount of catalyst in each layer because one of ordinary skill in the art would utilize amounts that result in effective hydrotreating.

Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angevine (4,306,964) as applied to claims 1 and 10 above, and further in view of Frye et al. (US 3,928,178).

As discussed above, the Angevine reference does not disclose a reactor or its use in which nozzles are included between catalyst beds for the addition of quenching oil or gas for temperature control.

The Frye reference discloses the injection of a quench fluid between catalyst beds in a hydrodesulfurization process. (See col. 4, line 43 through col. 5, line 7.)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process and apparatus of Angevine by including injection means in the reactor between catalyst beds in order to inject quench fluid because control of the reaction can be maintained and the rate of catalyst deactivation can be suppressed.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Angevine (US 4,306,964) as applied to claim 10 above, and further in view of Gardner et al. (US 4,657,663).

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As discussed above, the Angevine reference does not disclose catalyst layers separately packed into a plurality of reactors.

The Gardner reference discloses that a hydrotreating process that utilizes multiple catalyst beds can be equivalently performed by using one reactor or a plurality of reactors. (See col. 5, lines 9-21.)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Angevine by utilizing a plurality of reactors as suggested by Gardner because this is equivalent to utilizing one reactor containing multiple catalyst beds. Therefore, equivalent results will be expected through the use of one reactor or a plurality of reactors.

Claims 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Angevine (US 4,306,964) as applied to claims 5 and 10 above, and further in view of Savage et al. (US 5,454,933).

As discussed above, the Angevine reference does not disclose the oxides of claims 19 and 20.

The Savage reference discloses that hydrodesulfurization catalysts may utilize supports such as alumina, silica, silica-alumina, and titania. See col. 2, line 67 through col. 3, line 17.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process and apparatus of Angevine by utilizing a catalyst that contains an inorganic oxide such as silica, silica-alumina, or titania because the Savage reference suggests that these inorganic oxides would be as effective in hydrodesulfurization catalysts as alumina-based catalysts.

### *Response to Arguments*

The argument that applied references do not disclose or suggest at least six catalyst layers satisfying the claimed requirements is not persuasive because Angevine discloses three or more catalyst layers. The examiner asserts that the teaching of three or more layers would at least suggest using six layers even though no specific examples exist in Angevine that make use of a six-layer system. Additionally, since the explicitly disclosed three catalyst system satisfies the claimed relationship, the examiner maintains that one having ordinary skill in the art would also be motivated to have a fourth and any subsequent layers satisfy the claimed relationship. The assertion of unexpected results from the use of a six-layer system is not persuasive because the example in the specification is not commensurate in scope with the claimed invention. The example uses specific catalysts. However, the claims are not limited to these catalysts.

The argument that the applied references do not suggest the claimed amount of catalyst in each layer is not persuasive. One having ordinary skill in the art would necessarily utilize catalyst amounts in the process of Angevine that result in the desired effect of demetallation and desulfurization.

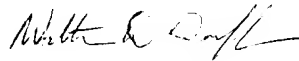
### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Walter D. Griffin whose telephone number is 703-305-3774. The examiner can normally be reached on Monday-Friday 6:30 to 4:00 with alternate Fridays off.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 703-308-6824. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0651.



Walter D. Griffin  
Primary Examiner  
Art Unit 1764

WG  
May 19, 2003